



CLOSING THE DIVIDE: ADDRESSING OBSTACLES FOR WOMEN IN ADOPTING DIGITAL FINANCE SOLUTIONS

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ABSTRACT

The focal point of this research paper is to identify the challenges/obstacles to widespread adoption of digital financial services (DFS) among women. Despite DFS's significant potential to provide accessible, acceptable, and safe banking options to underprivileged sections through cutting-edge technology such as mobile-oriented solutions, digital platforms, its adoption poses considerable challenges. The key objective is to recognize these challenges. The author investigated 14 key challenges culled from the literature. Primary data was collected from the 400 women of Haryana using multistage purposive sampling. Haryana was chosen for the study because lower sex ratio was recorded 914 females 1000 according to family health survey 2019-2020. According to census 2011, female literacy ratio approximately 65.9% lower than the national average. When it comes to workforce participation, it was 19-20% which is below the national average according to periodic labour force survey (PLFS). In order to fulfil the objectives of the study, Exploratory factor analysis tool was used. Factor analysis extracted the 3 unique factors from 14 variables such as "User Understanding and experience", "Technical and Infrastructure concerns", "Data Safety and confidentiality issues". The present research is one of the first few studies which is done through Primary survey data.

KEYWORDS: Digital Financial Inclusion, Digital Financial Services, Challenges, Obstacles Exploratory Factor Analysis

INTRODUCTION

The financial system has evolved as a result of the quick and sophisticated advancements in both telecommunications and information technology. It has been determined that digital financial technology has the potential to be a driver for faster economic growth in emerging nation (Telukdariea and Mungara 2023). Digital financial inclusion also contributes significantly to inclusive growth by offering appropriate financial services to marginalised groups such as women in rural areas (Bala and Singhal 2022). Digital financial inclusion provides numerous benefits to women. According to Klapper and Singer 2014, it can promote to women's economic empowerment by facilitating higher account ownership, wealth accumulation and economic involvement. In addition to this, it can assist women overcome hurdles such as cost, distance and transparency, allowing them to receive appropriate financial services on time. Overall, it has the potential to improve women's financial well-being by allowing them to participate in the global economy and benefit from financial goods and marketplaces (Kofman and Payne 2021). Despite all the benefits, According to GSMA (2023) Mobile gender gap report, Women in LMICs spend 25% of their income on entry-level handsets, while males spend 15%. In Egypt, there is a gender gap in internet expertise (51% women, 43% males). In Mexico, safety concerns prevail, whereas in Bangladesh, relevance perception (20% males, 14% women) and linguistic content difficulties impede adoption. Pakistan has a number of barriers to mobile internet usage, including network gaps and family approval. These are the obstacles to mobile internet adoption among mobile users who have knowledge of it. What this suggests we need to study further challenges faced by women in obtaining the digital financial

services.

We have some case studies and empirical evidence related to this. Women experience obstacles after using digital financial services. These obstacles include difficulty connecting to mobile network, unequal distribution of cell phones towers, and limited access to technology (Caron 2022). There are other risks linked with digital money, such as vulnerability to fraudsters and improper products for women's financial conditions (Kofman and Payne 2021). In case study of Zimbabwe, lack of identity documents, low education levels, Limited knowledge of mobile banking, technology penetration rates, and affordability are among the factors that continue to impede women's financial inclusion, despite developments in mobile technology and the provision of financial services via telephone services (Siwela and Njaya 2021). The study was conducted in Pakistan. Various societal and religious aspects influence Pakistani women capacity to access technology as well as afford and allow financial transactions (Ibtasam et al. 2018).

It is observed that digital financial services studies and reports are mostly focused on African countries with high level of mobile technology such as Kenya. However other countries have received very little attention. (Rana et al. 2020). In the context of India, primary study on digital financial inclusion challenges faced by women has not been done. The data was collected from the 400 women of Haryana. The current article fills that void by examining the and analysing many major hurdles faced by women towards digital financial inclusion.

This study focuses a strong emphasis on selecting the target group population, recognising India's economic growth as well as persistent difficulties such as gender digital divide. Haryana was chosen for the study because lower sex ratio was recorded 914 females 1000 according to family health survey 2019-2020. According to census 2011, female literacy ratio approximately 65.9% lower than the national average. When it comes to workforce participation, it was 19-20% which is below the national average according to periodic labour force survey (PLFS).

The following portions of the study are organised as follows: the next section examines past literature on DFS and identifies research gaps. Section 3 also outlines the technique employed in this paper. Following that, the outcomes of this investigation, including data analysis and results, are presented in Section 4. Section 5 addresses findings with managerial/practical significance. Finally, Section 6 closes the work with future research directions.

2. LITERATURE REVIEW

This section incorporates the digital financial inclusion literature, an overview of the existing digital financial inclusion status in India and in global context and the identification of significant challenges faced by Digital financial inclusion.

Gupta and Arya (2020) examined the role of digital finance in the growth of financial inclusion and women empowerment. They found that Financial Inclusion is positively related to women empowerment because it reduces the paper work, save consumer time and money and help in ensuring the credit worthiness of customer. Rohatgi et al. (2023) conducted a research work to analyze the impact of digital banking usage on women economic empowerment among the employed women. The study revealed all the variables are positively associated with women economic empowerment but digital banking usage was highly positively associated. Mabrouk et al. (2023) made an attempt to study the relationship between digital financial inclusion and women economic empowerment through the comparative analysis before and after covid 19. It was found that digital payment was the significant variable during the pandemic and digital financial inclusion has positive impact on women economic empowerment after the pandemic.

Despite all the benefits of digital financial inclusion on women empowerment. Women are still facing challenges towards digital financial inclusion. Numerous studies are there which highlights the challenges. Research by Antonio and Tuffley (2014) emphasized that "The Gender Digital Divide in Developing Countries" a number of obstacles seem to be preventing women in developing nations from having access to and using the Internet: "Poor technology infrastructure, low levels of literacy and numeracy, lack of fundamental technological skills, geographic isolation, and affordability difficulties related to poverty prevent many women from using ICTs. Ibtasam et al. (2018) conducted a study to analyse the women financial inclusion in Pakistan with knowledge, access and decision making. The finding indicates that women decision making power, financial capability, access to technology and

physical movement is more affected by gender. Aziz and Naima (2021) The study of the finding revealed that digital services have decreased the gap of physical access of financial services but we need to consider the digital divide and social inclusion. Manzoor et al. (2021) in their research paper revealed most of the population do not access formal and informal financial services, people are still using cash instead of digital method. It has been observed that banking facilities are not properly available. Due to low income and low financial literacy level, people are not aware regarding the usage of digital channels. Vijaya and Sethalakshmi (2019) attempted to study whether women are prepared to adapt themselves to the happening digital revolution. It was concluded that adaptability of women will not be problem if the necessary infrastructure is available. Dhanamalar et al (2020) intended to examine the impact of digitalization on rural and urban women empowerment. They found technology-oriented programs are being conducted in rural India for the benefit of women, but the projects are not successful because of the lack of provided to the women.

The study delves into the numerous critical challenges to shed light on the factors impeding digital financial services advancement in India, hence filling a major need.

Challenges	References
I might not feel safe due to uncertainty of data security and privacy	Klapper and Singer (2017), Ozili P.K. (2018), Arner et al. (2018), Aziz and Naima (2021), Malladi et al. (2021), Kulkarni and Gosh (2021), GSMA (2023),
There is poor internet connection/ slow download speed during transactions	Klapper and Singer (2017), Arner et al. (2018), Aziz and Naima (2021), Malladi et al. (2021), Ojo (2022)
It consumes lot of time to learn how to use digital financial services	Shifa Fatima J. (2020), Jin and Fan (2022), Koskelainen et al. (2023)
I might not feel secure because risk is associated with digital platforms	Ozili P.K. (2018)
lack of digital financial literacy	Ozili P.K. (2018), Arner et al. (2018), Malladi et al. (2021), Kulkarni and Gosh (2021), Ojo (2022), GSMA (2023)
lack of affordability of Smart Phone	Aziz and Naima (2021), Malladi et al. (2021), Kulkarni and Gosh (2021), GSMA (2023)
Transactions interrupted due to shortage of Power supply	Ojo (2022)
Financial Products are not appropriate	Kulkarni and Gosh (2021)
Receiver refuses to take payments online	Ojo (2022)
Lack of confidence while using mobile Phone	Kulkarni and Gosh (2021)
Do not use digital financial services because not able to understand the terms and conditions	Klapper and Singer (2017), Malladi et al. (2021)
Usually prefer to use traditional method instead of using digital services	Klapper and Singer (2017)
It is difficult to remember password	Klapper and Singer (2017), Kang (2018)

Hidden charges are involved in digital financial services	Aziz and Naima (2021)
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3. RESEARCH METHODOLOGY

Primary data was used to acquire the relevant information from the respondents. Multi-stage sampling procedure was followed. In the first stage, Haryana state in India was cho-sen for study. In comparison to the national average, women's participation in Haryana is substantially lower. Haryana is divided on the basis of divisions. There are 6 administra-tive divisions in Haryana. In the second stage, out of 6 divisions, Ambala division was selected randomly. Ambala division has 4 districts i.e., Ambala, Yamuna Nagar, Ku-rukshetra, Panchkula. Districts were sub-divided into blocks. In the third stage, two blocks were selected randomly from each district then Purposive sampling was used to contact with the respondents.

On the basis of proportionate sampling, we have female total population is 465431 which is given in the following table. Yamene (1973) developed a method that was utilised to select the sample for this investigation.

$$n = \left[\frac{N}{1 + N(e)^2} \right]$$

Where n is the Sample Size; N total population; and e tolerable error. (0.05 or 95 percent)

$$n = \left[\frac{465431}{1 + 465431(.05)^2} \right]$$

$$n = 399.65$$

$$n = 400$$

Sr. No	Division	Districts	Blocks
1.	Ambala	Ambala	Barara
			Saha
		Yamuna Nagar	Jagadhri
			Radaur
		Kurukshetra	Shahbad
			Ladwa
		Panchkula	Raipur Rani
			Barwala

Table 1: Districts and block wise representation of Ambala Division

Blocks	Popula-tion	% of pop-ulation among these blocks	Male pop-ulation	Female popula-tion	Number of female respon-dents pro-portionate basis
Barara	142207	14	74896	67311	58
Saha	105781	10	56038	49833	43
Jagadhri	240498	24	129896	110602	95
Radaur	116464	12	61538	54926	47
Shahbad	167766	17	88836	78930	68
Ladwa	88097	9	46446	41651	36
Raipur rani	59113	6	31716	27397	23
Barwala	77307	8	42526	34781	30

Total	977233	100	531892	465431	400
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Source: Data Analysis

Table 2: Proportionate Representation of Respondents

4. DATA ANALYSIS AND INTERPRETATION

4.1 Factor analysis

Factor analysis is a statistical technique used to figure out the number of unique factors essential to explain the consistent pattern of correlations among a group of variables (Leandre et. al., 2012). A factor is an unobservable quantity that affects many observed measures and explains correlations between these measurements (Brown, 2015). Factors are made up of correlated variables that are mostly independent of other subsets of varia-bles. The steps in principal component analysis (PCA) or factor analysis (FA) are to choose and measure a set of variables, prepare the correlation matrix (to perform PCA or FA), extract a set of factors from the correlation matrix, figure out how many factors there are, rotate the factors(probably) to make the results more understandable, and interpret the results (Tabachnick et al. 2013).

To begin with, we tested the validity of the instrument through Cronbach Alpha. Cronbach Alpha was used to check the internal consistency and reliability of the instru-ment. The value of Cronbach alpha turned out to be .888 of 14 statement, therefore it is possible to say that the instrument shall be considered reliable for the study.

Reliability Statistics	
Cronbach's Alpha	N of Items
.888	14

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.883
Bartlett's Test of Sphericity	Approx. Chi-Square	1815.805
	df	66
	Sig.	.000

Table 3: KMO and Bartlett's Test

Before performing the EFA, to make sure the sample data are suitable for factor analysis, we must first verify the data's factorability by preliminary testing (Ali et al. 2023). KMO provides a value between 0 and 1, where larger values represent better factor analysis suitability. To consider the data suitable for factor analysis, the KMO value must be at least 0.5 or above (Field, 2013). According to the Table 3, The KMO measure for our dataset was found to be 0.883 which is higher than the threshold of 0.5. In addition to this, table demonstrates that the Bartlett's Test significance value 0.000 (less than 0.5) is also significant that means sample data is suitable for factor analysis.

4.1.1 Communalities

The communality is a measure of how much of each variable's variance is explained by the factor solution (Hair, et al. 2019). To determine whether the variable meets acceptable levels of explanation, the researcher should look at the communalities. Communalities with a value of 0.5 or higher are taken into consideration for a better interpretation of the factor analysis results

	Initial	Extraction
I might not feel safe due to uncertainty of data security and privacy	1.000	.533
There is poor internet connection/ slow download speed during transactions	1.000	.632
It consumes lot of time to learn how to use digital financial services	1.000	.585
I might not feel secure because risk is associated with digital platforms	1.000	.694
lack of affordability of Smart Phone	1.000	.655
Transactions interrupted due to shortage of Power supply	1.000	.651
Financial Products are not appropriate	1.000	.639
Receiver refuses to take payments online	1.000	.518
Lack of confidence while using mobile Phone	1.000	.680
Do not use digital financial services because not able to understand the terms and conditions	1.000	.531
Usually prefer to use traditional method instead of using digital services	1.000	.715
It is difficult to remember password	1.000	.590

Table 4: Communalities

Extraction Method: Principal Component Analysis.

We had 14 statements at beginning but there were some statements that were removed from analysis because their communality value was less than 0.5. After removing the items, we again performed the factor analysis and then we got 12 statements. This above table was our final communality table.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.1	42.6	42.6	5.1	42.6	42.6	2.8	23.1	23.1
2	1.3	10.5	53.1	1.3	10.5	53.1	2.4	19.9	43.0
3	1.1	8.8	61.9	1.1	8.8	61.9	2.3	18.9	61.9
4	0.9	7.2	69.0						
5	0.6	5.4	74.4						
6	0.6	5.1	79.5						
7	0.5	4.5	83.9						
8	0.5	3.9	87.8						
9	0.4	3.5	91.3						
10	0.4	3.2	94.5						
11	0.3	2.9	97.4						
12	0.3	2.6	100.0						

Table 5: Total Variance Explained

Extraction Method: Principal Component Analysis.

4.1.2. Factor Extraction

We employ principal component analysis (PCA) for factor analysis due to its benefits and widespread application in data

reduction (Ali et al 2023). Principal components analysis helps to break down a large number of variables into a smaller number of components, by extracting the highest variance from the data set for each component (Yong et al. 2013).

4.1.3. Factors to be retained

After the extraction of factors through Principal component analysis. There are several methods used to decide how many factors should retain. These methods are Kaiser Crite-rion, Scree test and parallel analysis, but we employ kaiser criterion and scree test in our study because they are widely used. The eigenvalue can be defined as the ratio of the spe-cific variation that is explained by a certain extracted factor to the common variance (Shrestha 2021).

Kaiser's (1960) widely-used criterion states to retain only those elements whose eigenval-ues are larger than .1 (Keenan et al.). The results of kaiser criteria presented in table 5 showing that 3 factors which cumulatively 61.86% of the variance should retained.

Next, the scree plot is a graphical representation of Eigen values. The number of elements to retain is the number of datapoints above the break (excluding the break's actual location) (Taherdoost et al. 2022).

4.1.4. Factor rotation

The next step is to rotate the factors for improving the accuracy. The most popular type of rotational techniques for exploratory factor analysis is varimax rotation, which Thompson (2004) invented (Taherdoost et al. 2022). Varimax rotation aims to maximise the variance of factor loadings by raising high loading and low loading for every factor (Tabachnick et al. 2013), The table 6 showing that there is one cross loading (items occurring in more than one factor). Such as, item namely "It consumes lot of time to learn how to use digital financial services" has a cross loading in 2 factors with factor loading of .511 and .524 but .524 was higher loading which was occurring under the 2nd factor that was considered for the study. The loadings were sorted after this. The table 6 below shows the final factor pattern matrix.

Items	Component		
	1	2	3
Usually prefer to use traditional method instead of using digital services	.800		
Lack of confidence while using mobile Phone	.714		
It is difficult to remember password	.710		
Do not use digital financial services because not able to understand the terms and conditions	.585		
Transactions interrupted due to shortage of Power supply		.765	
lack of affordability of Smart Phone		.706	
Financial Products are not appropriate		.677	
It consumes lot of time to learn how to use digital financial services	.511	.524	

I might not feel secure because risk is associated with digital platforms			.760
There is poor internet connection/ slow download speed during transactions			.686
I might not feel safe due to uncertainty of data security and privacy			.635
Receiver refuses to take payments online			.604

Table no 6: Rotated Component Matrix

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

5. RESULTS AND DISCUSSION

5.1. Labelling the factors

When all variables have a significant loading on a factor and a suitable factor solution has been found. The study makes an effort to interpret the factor loading pattern. Therefore, the researcher will look at every important variable for a given factor, giving more weight to the variables that have higher loading, and try to give a factor a name or label that appropriately reflects the variables loading on that factor. (Hair et al. 2019).

Label	No	Variables	Loadings
User Understanding and Experience	12	Usually prefer to use traditional methods instead of using digital services	.800
	10	Lack of confidence while using mobile Phone	.714
	13	It is difficult to remember password	.710
	11	Do not use digital financial services because not able to understand the terms and conditions.	.585
Technical And Infrastructure concerns	7	Transactions interrupted due to shortage of Power supply	.765
	6	lack of affordability of Smart Phone	.706
	8	Financial Products are not appropriate	.677
	3	It consumes lot of time to learn how to use digital financial services	.524

Data Safety and confidentiality issues	4	I might not feel secure because risk is associated with digital platforms	.760
	2	There is poor internet connection/ slow download speed during transactions	.686
	1	I might not feel safe due to uncertainty of data security and privacy	.635
		Receiver refuses to take payments online	.604

Table no 7: Extracted Factors of challenges with labels, Variables and Factor Load-ings

Three components were taken out of the aforementioned table. In the matrix of rotated components. First factor is a combination of the 4 variables: 12,10,13,11 showing 42.59% variance. It was labelled as “User Understanding and Experience”. Variables in this factor were as: “Usually prefer to use traditional methods instead of using digital services”, “Lack of confidence while using mobile Phone”, “It is difficult to remember password”, “Do not use digital financial services because not able to understand the terms and conditions”.

The second Factor identified 4 variables: 7,6,8,3 with an eigen value 1.25 and 10.46 % of the variance, The first variable “Transactions interrupted due to shortage of power supply” shows that power supply shortages have a considerable negative influence on the usability of digital services. Second variable “lack of affordability of Smart Phone” reveal not able to afford the smartphone also affect the usage level of digital financial services. Third Variable “Financial Products are not appropriate”, Fourth variable “It consumes lot of time to learn how to use digital financial services”. After Pooling the variables, they were named as “Technical and Infrastructure concerns”.

Factor 3 consists of 4 variables with the numbers 4,2,1, and 9 with a variance 8.79%. These factors variables, such as “I might not feel secure because risk is associated with digital Platforms”. “Poor internet connection/slow download speed during transactions”, “I might not feel safe due to uncertainty about data security and privacy” and “Receiver refuses to take payments online”. As a result, this factor was classified as “Data Safety and confidentiality issues”.

6. Conclusion, Research Implications and Limitations of the study

The expansion of Digital financial inclusion In India occurs with a gradual pace due to inherent challenges. This paper aimed to acknowledge these hurdles. In first phase of study, a thorough literature review addressed 14 key challenges in this domain. In second phase of study, based on primary survey

data (sample of 400 women of Haryana) using a factor analysis tool has identified those variables which are most influential or related to each other. This study found 12 variables under 3 constructs/factors named as “User Un-derstanding and Experience”, “Technical and Infrastructure concern”, “Data Safety and confidentiality issues”.

Utilising these relevant constructs/factors, regulatory bodies, practitioners and policy mak-ers can effectively prioritize their actions and resources to rectify or eradicate the chal-enges pertaining to digital financial services In India. For the sake of women’ s financial inclusion, more efforts should be made to provide access to digital financial services, digi-tal education, and so on.

Despite the fact that this study made significant efforts to make study more reliable and comprehensive by validation of variables through primary survey data. The study recog-nises its constraints which future research might explore further within this field. Explora-tory factor analysis can be further extended to confirmatory factor analysis (CFA) and structure equation modelling (SEM). CFA can be used for reliability and validity of the underlying constructs. SEM tool can be used for analysing the complex relationship be-tween variables. This Study can be conducted in the other states of India because this study is confined to Haryana only.

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